



Downwind Effects: Public Health Response & Recovery to the Nation's Largest Gas Leak

Los Angeles County Department of Public Health

Katie Butler, MPH

Environmental Epidemiologist

July 14, 2016

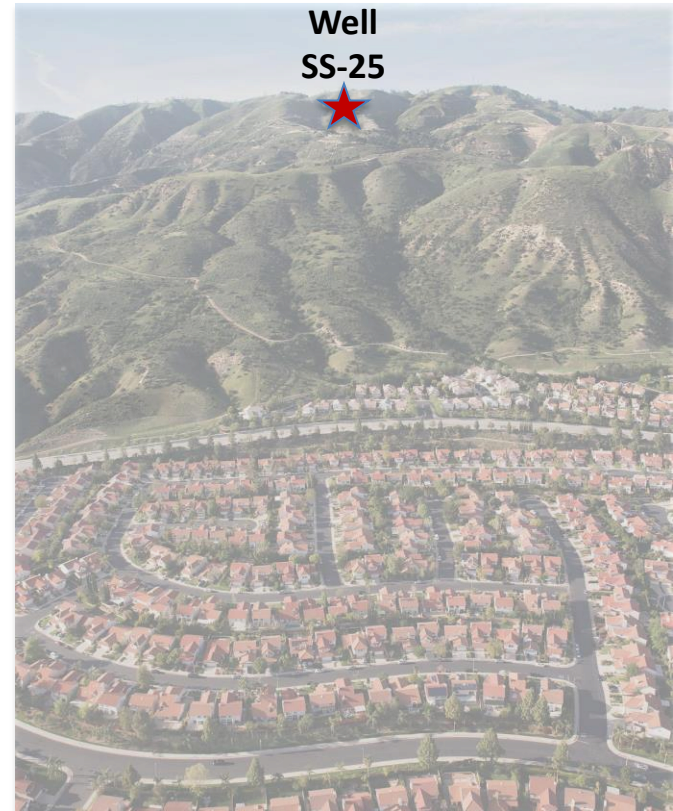


L.A. County Public Health – Initial Response

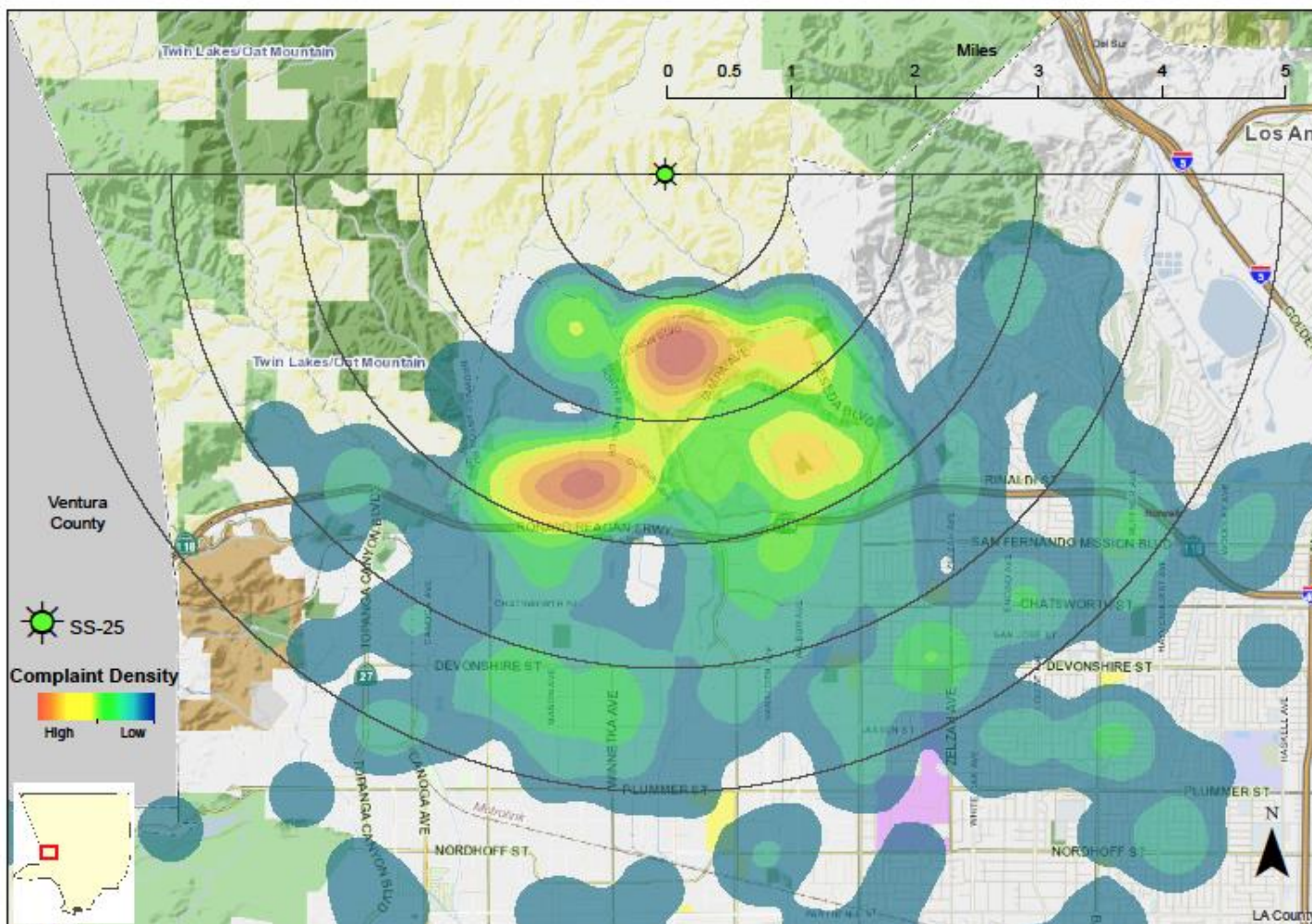
- Public Health was notified of the gas leak on Oct. 28
- Review and interpret results of air monitoring data from the first few days of the gas leak:
 - Methane,
 - Sulfur odorants,
 - Hydrogen sulfide
 - Benzene and other volatile gases
- Presented information on health impacts of sulfur odors at a community meeting on November 4.
- Closely monitored situation reports to gauge how long it would take to stop the flow of gas.

Common Symptom Complaints from Residents

- Headache or migraines
- Nausea / vomiting / stomach ache
- Nosebleeds
- Shortness of breath /
- difficulty breathing
- Chest tightness / chest heaviness
- Dizziness / lightheadedness
- Eye irritation
- Nose or throat irritation
- Cough



Symptoms Reported to Public Health by Distance to Well SS-25



Aliso Canyon Symptom Survey Respondent's Address

Created by: Office of Health Assessment and Epidemiology, Epidemiology Unit, 02/3/16. Map shows the density of Symptom Survey respondent's addresses. 511 of 687 addresses were located (the rest were excluded due to incorrect or missing addresses).

Public Health Directive for Relocation

- Nov 19: Public Health issued a directive to SoCalGas to offer free, temporary relocation to any area residents affected by odors from the Aliso Canyon site
 - Preliminary Environmental Health Assessment:
 - Odors are causing significant symptoms to some residents
 - Symptoms expected to continue as long as odors remain
 - Followed by a supplemental directive in December to relocate schools in Porter Ranch

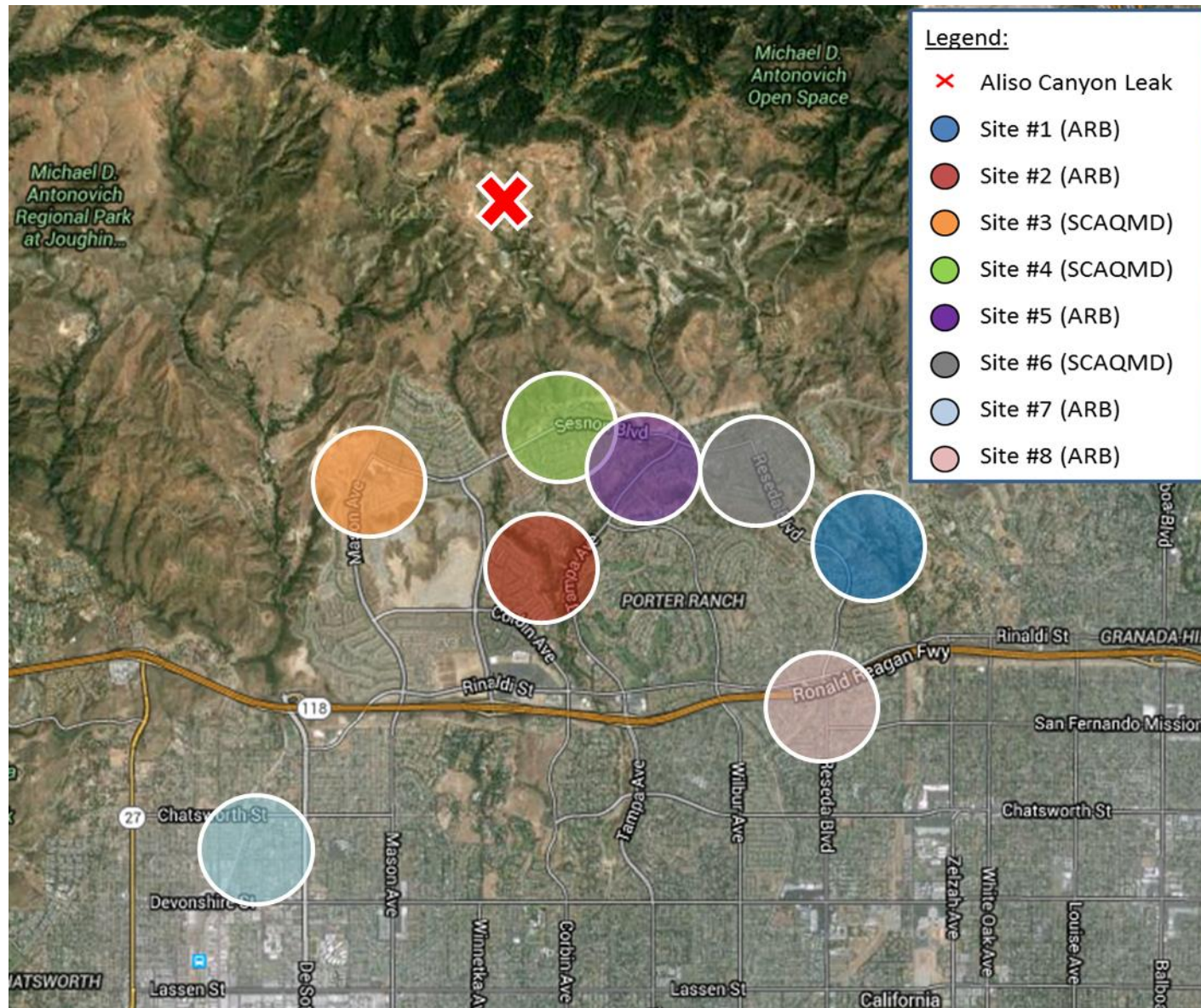
Expanded Air Monitoring Plan

- When LA County Department of Public Health (DPH) was informed the gas leak could take several months to fix, DPH began coordinating with other agencies and the Gas Company to implement more testing.
- DPH identified ways to improve monitoring efforts, including:
 - more strategic community locations,
 - stricter laboratory reporting limits,
 - expanded analytical list of chemicals, and
 - longer sample collection times.

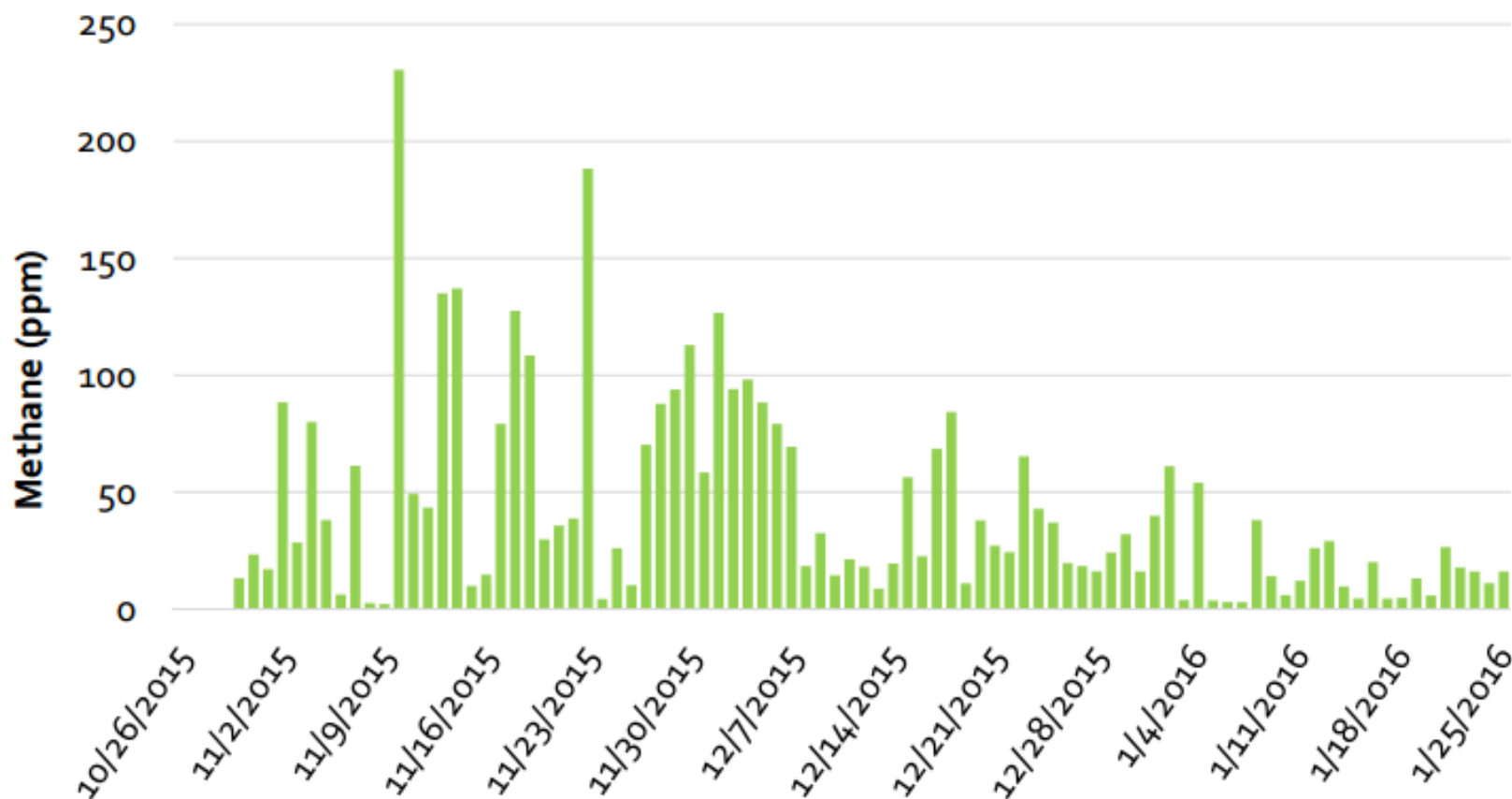
Expanded Air Monitoring Overview of Activities

- The Gas Company collects daily samples on the facility, the property line and in the community.
- Local and state air quality agencies (Air Quality Management District [AQMD] and California Air Resource Board [CARB]) are also collecting independent samples.
- LA County Fire HazMat and DPH conduct random spot checks of the Gas Company's field sampling protocols.
- DPH evaluates all available data from the Gas Company and the air quality agencies to inform ongoing health assessment activities.

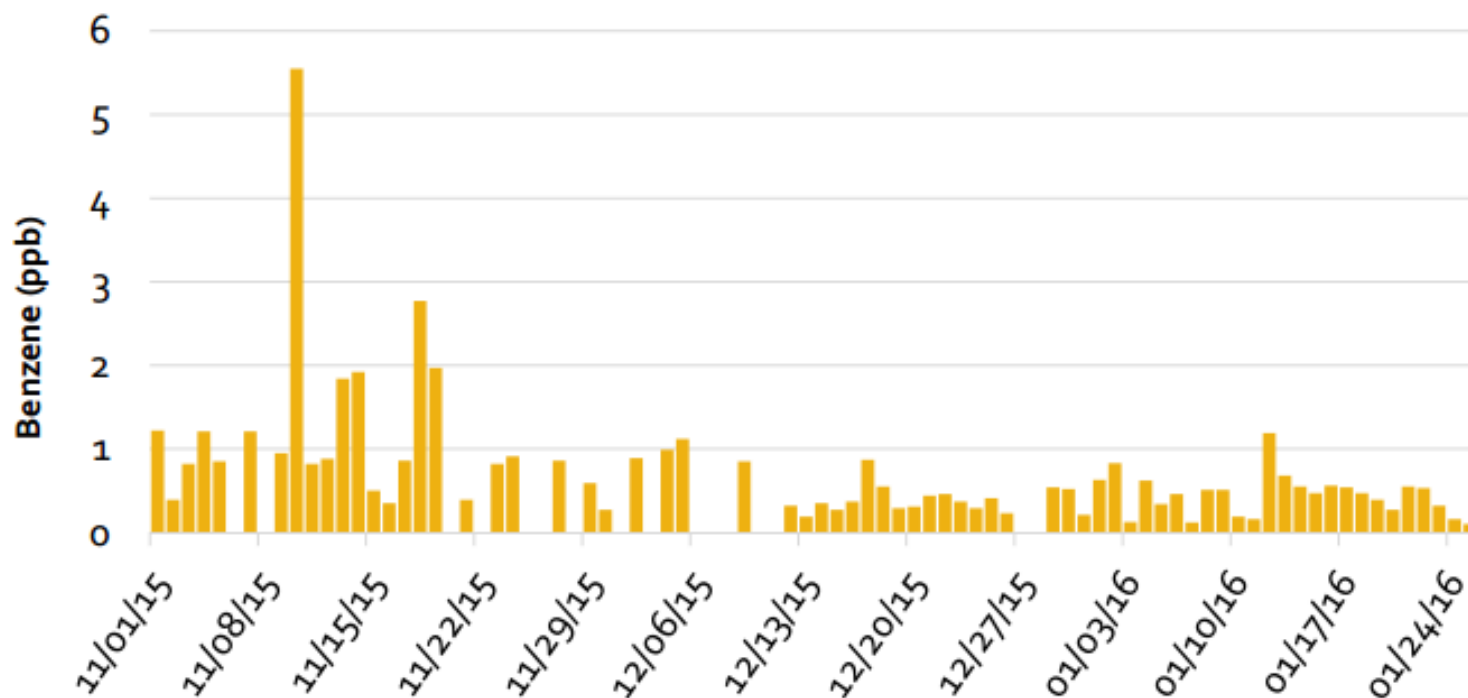
SCAQMD & AQMD Air Monitoring



Outdoor Methane Levels (Nov. 2015 – Jan. 2016)



Outdoor Benzene Levels (Nov. 2015 – Jan. 2016)



*Non detectable levels are shown as zero (0). There are a total of 16 days that are shown as zero. The detection limits of the laboratory tests used for samples collected by SoCalGas in November and December 2015 were not as low (sensitive) as the laboratory tests performed after that time.

Expanded Analytical List of Chemicals Tested in Outdoor Air at the Facility

- Chemicals in outdoor air were detected at higher concentrations downwind of the leak, as compared to upwind (January 27, 2016). Suggests complex gas mixture emitted:
 - Barium
 - Copper
 - Polycyclic aromatic hydrocarbons
 - Benzene
 - Cyclohexane
 - Toluene
 - Other volatiles: hexane, n-nonane, n-octane

Summary of Health Assessment During Gas Leak

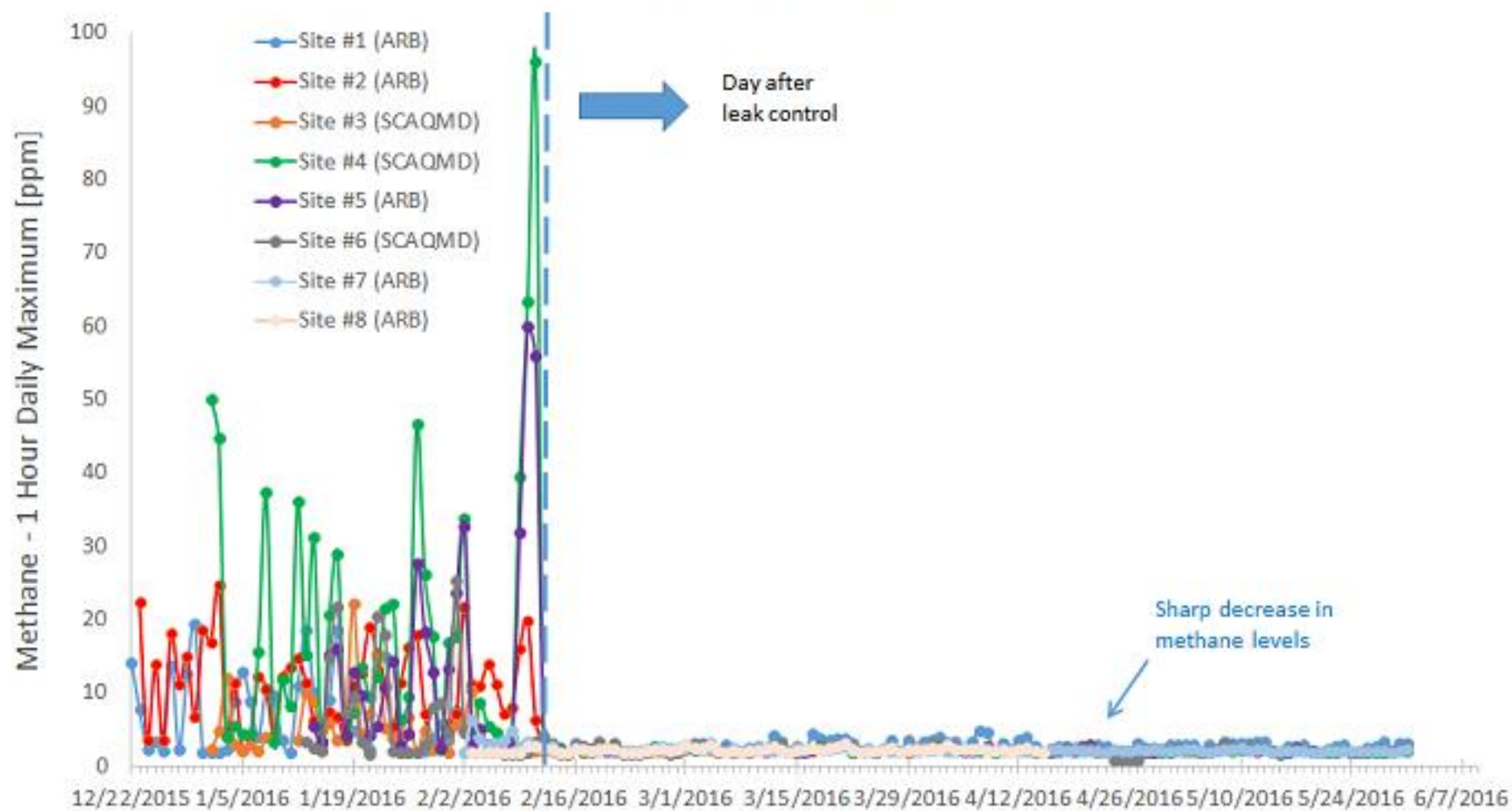
- Sulfur odorant appeared to be responsible for the symptoms, based on available data and information from mercaptan study in Alabama.
- However, symptoms do not completely match those experienced by odorants alone and suggest some uncertainty about the cause.
- Data gaps in information for expanded list of chemicals during the early period of the gas leak.



Post-Leak Public Health Response

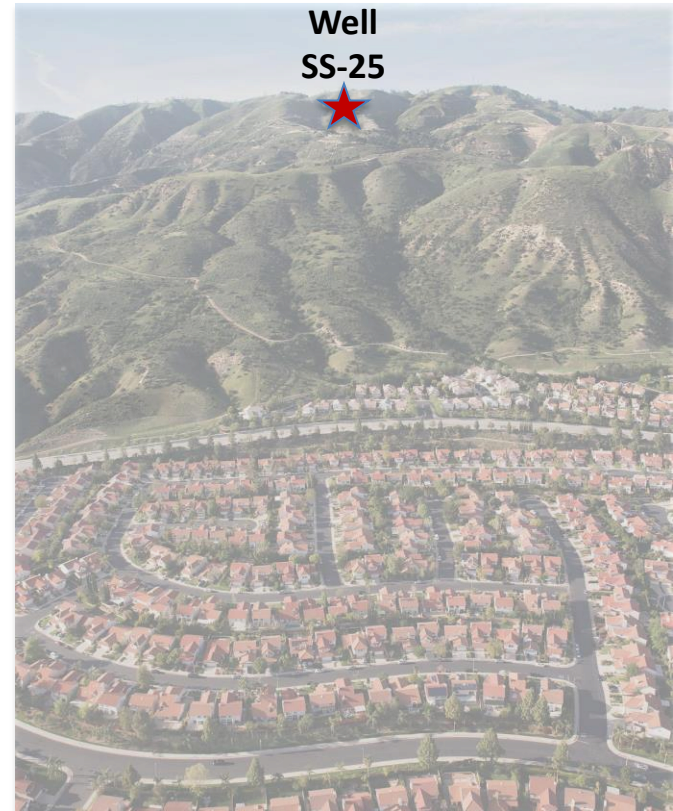


Porter Ranch Community Methane Monitoring 1 Hour Daily Maximum



Common Symptom Complaints from Residents

- Headache or migraines
- Nausea / vomiting / stomach ache
- Nosebleeds
- Shortness of breath /
- difficulty breathing
- Chest tightness / chest heaviness
- Dizziness / lightheadedness
- Eye irritation
- Nose or throat irritation
- Cough

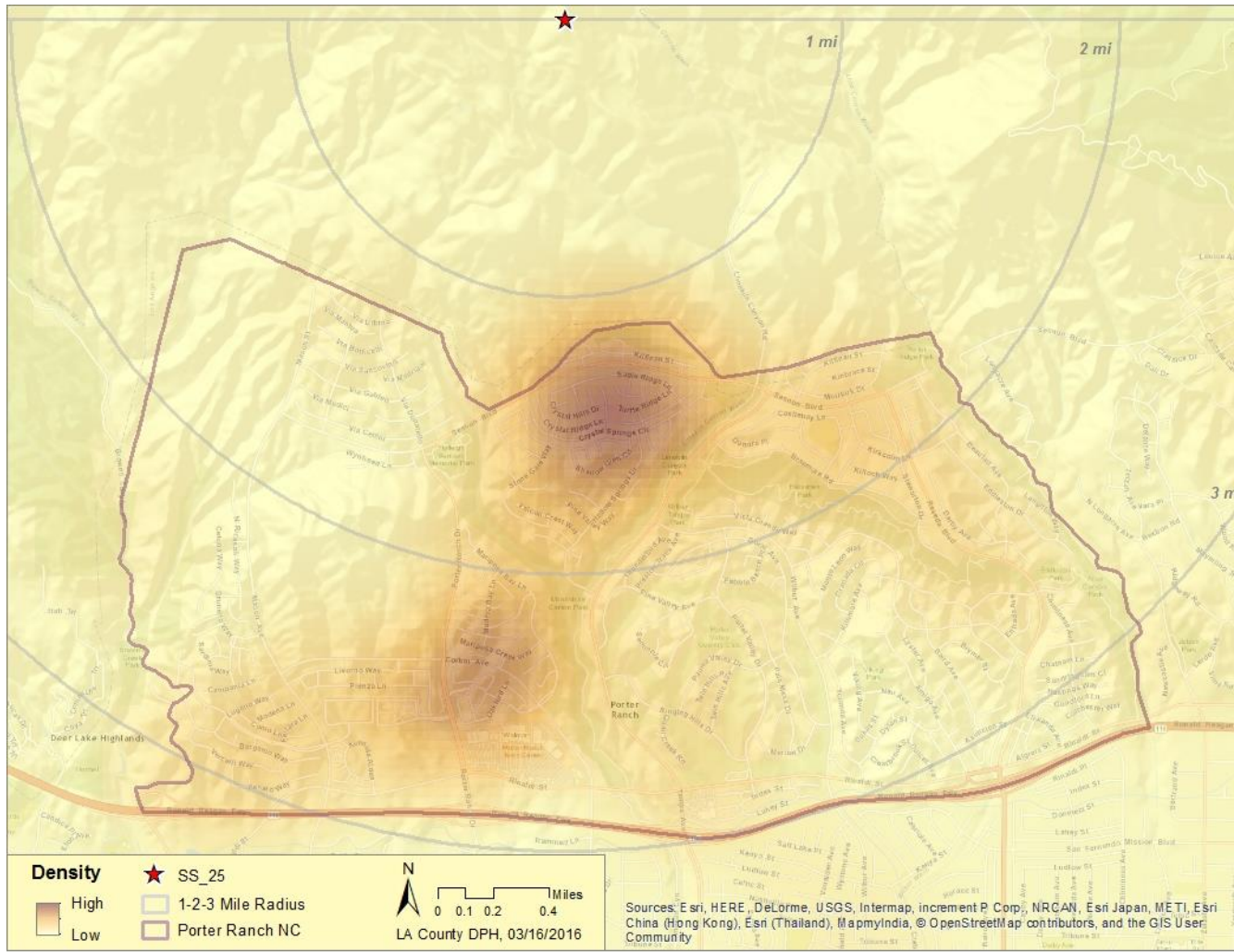


Oily Residue

- Frequent reports of “oily residue” on outdoor surfaces
 - e.g. cars, patio furniture, playgrounds, etc.
- Consists of long-chain hydrocarbons found in crude oil
- Aliso Canyon is a former oil reservoir -- oil liquid droplets from underground surfaced with the leaking gas



Density Map of Symptoms Reported to Public Health in the Month after the Gas Leak was Sealed



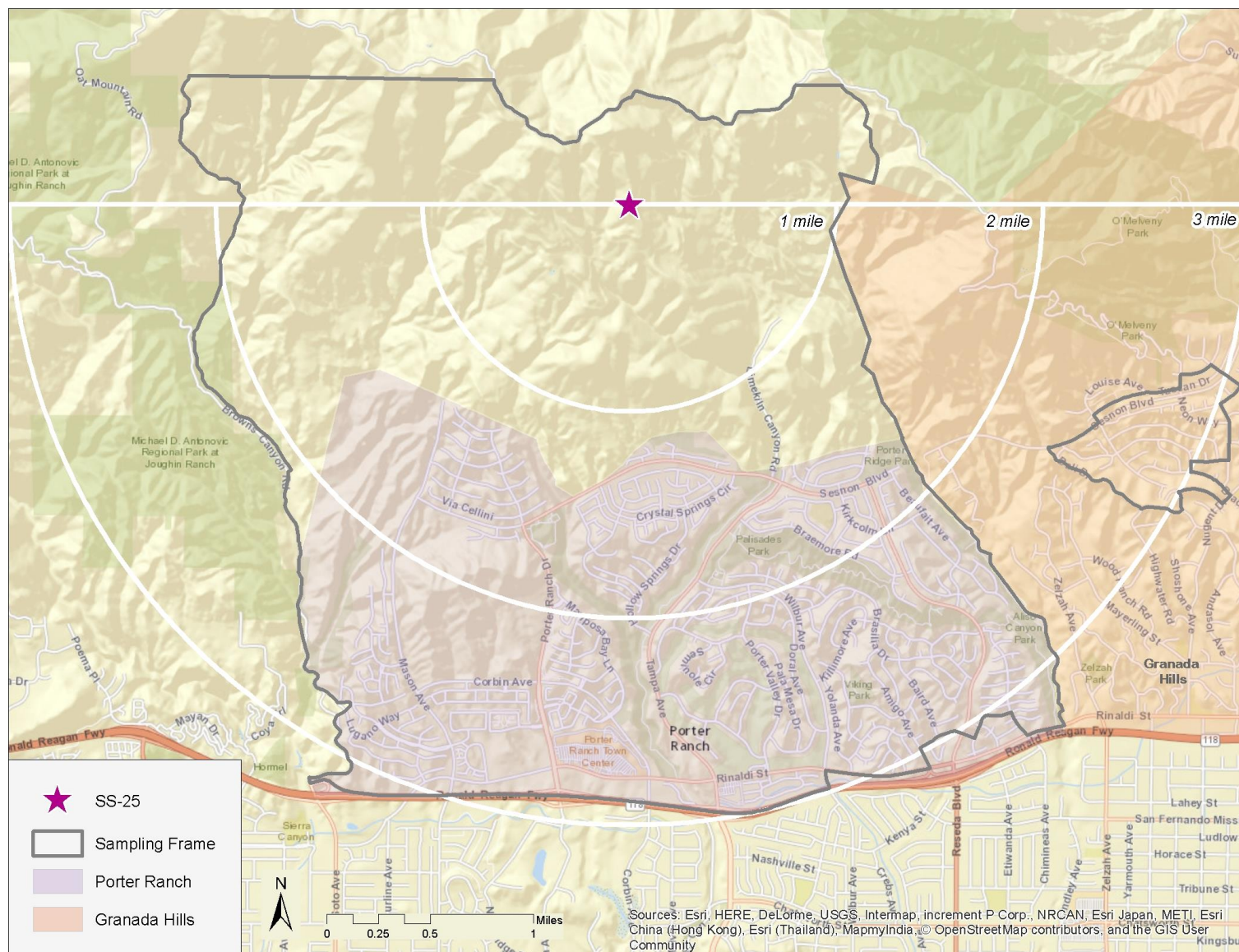
Public Health Assessment - Recovery Phase

- Health Effects Evaluation
 - Community Assessment for Public Health Emergency Response (CASPER)
- Indoor Exposure Evaluation
 - Indoor Environmental Testing Program
 - Multi-agency workgroup (OEHHA, US EPA, CARB, CDPH, SCAQMD, LA County Fire-Health Hazmat)
 - UCLA and UC-Berkeley and other experts provided technical assistance

CASPER

- Centers for Disease Control and Prevention (CDC)-developed tool to obtain rapid household-based information on health, basic needs, etc. after a disaster
- Objectives:
 - 1. Assess frequency and types of health symptoms
 - 2. Determine scope of reported odors and oily residue
 - 3. Develop recommendations to guide public health response

CASPER Sampling Frame

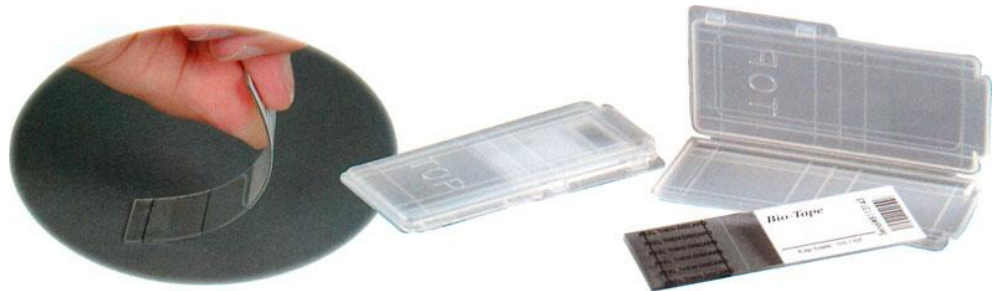


CASPER Results

- Symptoms reported:
 - Before leak was sealed: 81%
 - After leak was sealed: 63%
- Majority of households (61%) sought medical care for symptoms experienced after well was sealed
- Residents commonly report alleviation of symptoms upon leaving their homes, both before and after leak was sealed
- 41% of households reported smelling “gas-like” odors after leak was sealed
- 35% of households reported oily residue and another 12% didn’t know if they noticed oily residue

Indoor Exposure Evaluation

1. Household dust samples



2. Indoor air sampling used 4 instruments to collect air over 24-hour period



Indoor Exposure Evaluation Results

Household dust:

Metals in dust detected more often/higher concentrations in Porter Ranch homes than comparison homes

- Not expected to pose long-term health risk (very low levels)
- Could contribute to short-term symptoms reported
- Barium and other metals were used in drilling muds

Air sampling:

- Levels of chemicals in indoor air samples were similar between Porter Ranch homes and comparison homes

Public Health Recommendations

- Ventilate homes to flush out residual contaminants – run central fans and heating/ventilation/air conditioning (HVAC) units and open all doors, windows and large cabinets
- Clean all surfaces – use high efficiency particulate air (HEPA) filter vacuum and wet wipe hard surfaces
- Clean air ducts
- Change air filters
- Maintain air purifiers and change filters regularly
- Spot treat oily residue
- Launder clothing



Public Health Directive for Interior Home Cleaning

- May 13: Public Health issued a directive to SoCalGas to implement the comprehensive cleaning of all homes:
 - (1) Located in Porter Ranch
 - (2) Relocated as a result of the gas leak disaster
 - (3) Located within 5 miles of Well SS-25 where residents experience symptoms
- May 20: Los Angeles County Superior Court ruling ordered SoCalGas to offer and pay for professional comprehensive cleaning in homes of residents who are relocated due to the Aliso Canyon gas leak disaster prior to their return home

Thank you

